Ice Core Lab Teacher’s guide

1. The purpose is to get a hands on feel for what ice cores tell us about the past. The students should be able to look at the core and determine what the climate was like and the amount of life on the planet. Understanding the way we get the knowledge of the past is important in order to give it validity.
2. Understanding past climate

Understand climate cycles/change

Analyze proxy indicators and what they tell us about the life

12.B.5a Analyze and explain biodiversity issues and the causes of extinction

12.E.4b Describe how rock sequences and fossil remains are used to interpret the age and changes in the Earth

3) All you need for this lab are the 3 sets of cores and lab packet.

4) This lab should take 45 minutes- an hour

5) No safety issues

6) Introduce ice cores as pre-lab: where we collect them, why we collect them, what they tell us, proxy indicators (see introduction in lab. For post-lab discussion we will go over the questions and have someone tell us about the climate of each core.

7) Here are the numbers I used and themes for each core.

1) The first core will demonstrate the basic relationship between CO2 and temperature. Data suggests that there is a large correlation between the CO2 level and temperature. This demonstrates a normal cooling and warming cycle.

Slice 1- Equal O16 and O18 (O16: 8/O18:8) CO2:25

-lots of CO2

Slice 2- O16/O18 a little heavier in the O16 favor (10/6)15

-decrease from slice 1 in CO2

Slice 3- O16 almost completely (14/2) 5

-very little CO2

Slice 4- O16 completely (16/0) 2

-very little CO2

Slice 5- O16/O18 getting more even (12/4) 7

-CO2 rises from slice 4

Slice 6- O16/O18 back to close to even (10/6) 15

-CO2 is high again

2) 2 main concepts in this core are climate changed rapidly in the past and CO2 isn’t always the best indication of climate because it takes time for animals to repopulate... This could just be used as an example to demonstrate the Younger Dryas specifically or just rapid climate change in general

Slice 1- O16 outnumbers O18 (10/6) 15

-lots of CO2

Slice 2- O16 really outnumbers O18 (showing warming) (14/2) 5

-not as much CO2

Slice 3- O16 almost completely fills (near the end of the Ice Age) (16/0) 2

-next to no CO2

Slice 4- O16 entirely (middle of Ice Age) (16/0) 2

-no CO2

Slice 5- O18 makes a sharp increase (Climate swing) (8/8)5

-very little CO2

Slice 6- O16 takes over again (back to Ice Age) (16/0) 2

-no CO2

3) This will show some ash deposits and how major volcanic eruptions can affect global climate and cause an ice age and massive extinctions. This shows how it went from an aquatic environment to terrestrial and a volcanic eruption caused life to drop dramatically

Slice 1- O16 completely (16/0) 2

- little bits of ash

Slice 2- O16 completely (16/0) 0

-little less ash

Slice 3- Almost completely O16 (12/4) 7

-ash

-little CO2

Slice 4- O16 and O18 are even (8/8) 15

-a lot of ash

-major decrease in CO2

Slice 5- O16 and O18 are about even (9/7) 25

-pollen trapped

-no ash

Slice 6- O16 and O18 are about even (8/8) 25

-aquatic fossils

-no ash

8) The students will work in groups of 2 or 4 with the ice core sets and nothing would need to be replaced except for rubber bands if they break.